## METHODS OF ANALYSIS/DRUG IDENTIFICATION

### 1 Introduction

The purpose of PART III B is to recommend minimum standards for the forensic identification of commonly seized drugs. It is recognized that the correct identification of a drug or chemical depends on the use of an analytical scheme based on validated methods and the competence of the analyst. SWGDRUG requires the use of multiple uncorrelated techniques. It does not discourage the use of any particular method within an analytical scheme and it is accepted that unique requirements in different jurisdictions may dictate the actual practices followed by a particular laboratory.

### 2 Categorizing analytical techniques

Techniques for the analysis of drug samples may be classified into three categories based on their discriminating power. Table 1 provides examples of these techniques listed in order of decreasing discriminating power from A to C.

Table 1: Categories of Analytical Techniques

| Category A | Category B | Category C |
|---|---|---|
| Infrared Spectroscopy | Capillary Electrophoresis | Color Tests |
| Mass Spectrometry | Gas Chromatography | Fluorescence Spectroscopy |
| Nuclear Magnetic Resonance Spectroscopy | Ion Mobility Spectrometry | Immunoassay |
| Raman Spectroscopy | Liquid Chromatography | Melting Point |
| | Microcrystalline Tests | Ultraviolet Spectroscopy |
| | Pharmaceutical Identifiers | |
| | Thin Layer Chromatography | |
| | Cannabis only: Macroscopic Examination Microscopic Examination | |

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## 3 Identification criteria

SWGDRUG recommends that laboratories adhere to the following minimum standards:

3.1 When a validated Category A technique is incorporated into an analytical scheme, then at least one other technique (from either Category A, B or C) shall be used.

    3.1.1 This combination shall identify the specific drug present and shall preclude a false positive identification.

    3.1.2 When sample size allows, the second technique should be applied on a separate sampling for quality assurance reasons. When sample size is limited, additional measures should be taken to assure that the results correspond to the correct sample.

    3.1.3 All Category A techniques shall have data that are reviewable.

3.2 When a Category A technique is not used, then at least three different validated methods shall be employed.

    3.2.1 These in combination shall demonstrate the identity of the specific drug present and shall preclude a false positive identification.

    3.2.2 Two of the three methods shall be based on uncorrelated techniques from Category B.

    3.2.3 A minimum of two separate samplings should be used in these three tests. When sample size is limited, additional measures should be taken to assure that the results correspond to the correct sample.

    3.2.4 All Category B techniques shall have reviewable data.

3.3 For the use of any method to be considered of value, test results shall be considered "positive." While "negative" test results provide useful information for ruling out the presence of a particular drug or drug class, these results have no value toward establishing the forensic identification of a drug.

3.4 In cases where hyphenated techniques are used (e.g. gas chromatography-mass spectrometry, liquid chromatography-diode array ultraviolet spectroscopy), they will be considered as separate techniques provided that the results from each are used.

**3.5**   Cannabis exhibits tend to have characteristics that are visually recognizable. Macroscopic and microscopic examinations of cannabis will be considered, exceptionally, as uncorrelated techniques from Category B when observations include documented details of botanical features. Additional testing shall follow the scheme outlined in sections 3.1 or 3.2.

> **3.5.1**   For exhibits of cannabis that lack sufficient observable macroscopic and microscopic botanical detail (e.g. extracts or residues), $\Delta^9$-tetrahydrocannabinol (THC) or other cannabinoids shall be identified utilizing the principles set forth in sections 3.1 and 3.2.

**3.6**   An identification of botanical material may be made utilizing morphological characteristics **alone** provided sufficient botanical features appropriate for identification are observed. Such examinations shall be made by analysts competent in botanical identifications. In this context botanical competence applies to those examiners recognized as professional botanists or those assessed to be competent by such. Identifications of chemical components contained in botanicals (mescaline, opiates, psilocin, etc.) should rely on principles of chemical identification set down in Table 1.

**3.7**   Examples of reviewable data are:

- printed spectra, chromatograms and photographs or photocopies of TLC plates
- contemporaneous documented peer review for microcrystalline tests
- reference to published data for pharmaceutical identifiers
- recording of detailed descriptions of morphological characteristics for cannabis (only).

# 4   Comment

These recommendations are minimum standards for the forensic identification of commonly seized drugs. However, it should be recognized that they may not be sufficient for the identification of all drugs in all circumstances. Within these recommendations, it is up to the individual laboratory's management to determine which combination of analytical techniques best satisfies the requirements of its jurisdiction.